OCTOBER 1998

FAA Aviation news

AVIATION SAFETY FROM COVER TO COVER

PARACHUTES:.....Page 1

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OCTOBER 1998

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FEATURES

1 Parachutes: To Wear or Not to Wear
6 Emergency Bailout Procedures
8 Survival of the Fittest
13 The Killer Gas
17 Current vs. Proficient
20 Haunting Tales from...ASRS
21 Swimming Against the Tide
23 In the Mail --
Flight Standards' Customer Satisfaction Survey

DEPARTMENTS

25 Safety Alerts
26 FlightFORUM
27 AvNEWS
BACK COVER Editor's Runway

FRONT COVER: Flying in winter poses unique survival situations. See page 8.
BACK COVER: Piper Warrior II.

PARACHUTES: TO WEAR OR NOT TO WEAR

By H.Dean Chamberlain

Like personal flotation devices, the government's term for "life vests," parachutes are not something people stand around talking about. In fact, I think most people don't want to even think about parachutes, let alone talk about them. For example, how many remember the old joke pilots ask of skydivers, "Why would anyone want to jump out of a perfectly good airplane?" And when was the last time you ever saw an advertisement at your local aircraft dealership showing the latest color-coordinated parachutes and hot neon-colored jumpsuits that everyone should buy to wear in their FAA-approved, four-passenger, Mark One sky chariot?

To paraphrase one comedian, parachutes just don't get any respect. I also don't think aircraft manufacturers want to remind customers that occasionally aircraft do fail in flight or that sometimes two meet unexpectedly in flight. When that happens, in most cases, the aircraft and passengers fall disastrously to earth.

The military learned this lesson early in the development of the airplane, and many of its flight crews have worn or have had access to parachutes in their aircraft since the WW I era. Today, few fighter pilots would dare takeoff with a nonfunctioning ejection seat or parachute.

So why am I writing about parachutes? There are several reasons. Once in my life I gave some thought to skydiving. Fortunately, the thought passed before I could embarrass myself. I even did an article about skydiving and skydiving safety which highlighted the important role the United States Parachute Association (USPA) plays in sport parachuting. That article was published in the January-February 1994 issue of *FAA Aviation News* as part of our special FAA and Industry series. The article reported how USPA is one of the two widely recognized industry groups involved in parachuting. The other group is the Parachute Industry Association (PIA) which is primarily made up of parachute equipment manufacturers. Both organizations are recognized by FAA as important partners in the

Ram-air style parachute canopies provide great maneuverability. Although used primarily by sport skydivers, such as this one being "flown" by a member of the U.S. Army Parachute Team, the Golden Knights, ram-air style parachute canopies can be custom ordered in some emergency parachute rigs. (AFIS photo)

The traditional round canopy is the style of parachute familiar to most people. Used in military and civilian parachutes for decades, the round canopies used in today's civilian emergency parachutes can be ordered in various sizes, porosity, and descent rates. (AFIS photo)

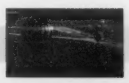
development of parachute equipment and safe parachute operating practices for both sport and emergency use.

Later, I had to strap into a parachute for a ride in a Pitts acrobatic aircraft. I still remember the safety briefing that included the reminder in case of an emergency to only unfasten the seat belt and shoulder harness and stand up and dive over the side of the aircraft. I was told to keep my hands off the parachute harness connectors. I was also reminded to remember to pull the ripcord. Needless to say, I was happy to get back on the ground. I had no desire to try and remember which harness I could safely unfasten and which one I couldn't. I also didn't like the idea of having to dive over the side of the aircraft. I felt like I was sitting on an armed ejection seat. The thought of having to ever use a parachute sort of takes some of the fun out of flying. The Pitts flight was the only time I have ever worn a parachute while flying. Like most pilots, I always expect to land an aircraft rather than jump out of it.

Then, as I have mentioned before, I like to fly gliders whenever I can. Many glider pilots frequently wear parachutes. One reason is parachutes are required in sanctioned Soaring Society of America competitions, so many pilots own them. As one pilot told me once, "The chute came with the glider when the glider was purchased, and it is something soft to sit on." Some pilots of very high performance gliders wear them just in case something breaks in flight. Others wear them in case of a mid-air collision. And, like in airplanes, aerobatic glider pilots and passengers must wear them when doing aerobatics.

For whatever their reasons, I have watched more than one glider pilot strapping on a parachute before a flight. Many were pilots in their later years. So I started to wonder if these experienced pilots knew something I didn't. Some saying about there are old pilots, and there are bold pilots, but there are few old, bold pilots kept floating through my mind. I began to think that just maybe I should consider buying a parachute.

Then the fun began. As I started to research the subject, I discovered a



Tom Knauff and Doris Grove, owners of Keystone Gliderport in Julian PA, prepare for a glider flight wearing backpack style emergency parachutes. (Photo courtesy of Strong Enterprises)

few interesting things. For example, you can't expect to look in your favorite consumer type magazine and find parachutes rated. Nor does your local FBO normally sell parachutes. Nor does one of the largest pilot supply catalogs list parachutes, although many of the glider supply dealers do. I also talked to several parachute manufacturer's representatives and master parachute riggers at several aviation events. I even called the owner of my favorite glider port for advice. Finally, I talked to FAA people about parachutes.

The stock answer you will hear from most sales representatives is, "Our parachute meets FAA Technical Standard Order (TSO) C-23 (series)." They will also tell you, you can buy your parachute in your choice of material, size, and style. You can also select the color of your harness and packing container, etc. You can even select your choice of accent colors for your parachute's container. Some will sew your initials on your gear for a small fee. To gain a competitive edge, some companies will even throw in a protective, color-coordinated carrying bag for your parachute and harness if you buy it at a major aviation event.

Although everyone was very professional and helpful, no one completely answered my basic question of what is the best parachute that I can buy in the expectation that I never want to ever have to use it. Remember, cost is not an issue since the emergency parachute industry seems to be very competitive. Most of the parachutes and accessories I have looked at are within a few dollars of each other depending upon style, type of harness, type of fasteners, and canopy. You can expect to spend about $1,200 give or take a $100 or so dollars for your average emergency parachute. Options and accessories will increase the price.

No, they don't offer test jumps as part of the sales pitch. But then, you have to remember that emergency parachutes only contain one parachute or canopy. Skydivers jump with two 'chutes. One is their main 'chute that they, themselves, can pack. The second one is an emergency chute that an FAA-certificated parachute rigger must pack within a prescribed number of days based upon the material used to make the parachute. But for an aircraft emergency, pilots and crew only get one chance with their emergency 'chute. That is why you have to make that one jump a good one.

That is why I think parachutes are like PFD's. You hope never to have to need it in a life-threatening situation,

but if you do, you want the best money can buy. When you are falling from the sky or drowning in the ocean, cheap does not cut it. If you can't afford to buy at least a good or, hopefully, the best survival equipment available, then you surely can't afford to die. If you haven't priced the cost of dying recently, it is extremely expensive, plus it can ruin your whole day. So much for morbid humor. I hope I didn't offend anyone, but good equipment and safety do have their costs. But the cost of safety is less than the cost of dying or suffering a permanent injury.

As I continue researching how to buy an emergency parachute, I keep thinking if every emergency parachute has to meet the same TSO, does it really matter which parachute one buys. Sort of like trying to decide between a Chevrolet and a Ford. Which one do you buy? Both will get you down the road. Needless to say, I still haven't bought one yet, parachute or motor vehicle. The search continues.

Adding to my interest was the fact that at this year's annual Department of Defense open house and airshow commemorating Armed Forces Day at Andrews Air Force Base, MD, I saw elements of the Army's 82nd Airborne Division make a mass parachute jump from a line of C-130 and C-141 aircraft. The Army's Golden Knights parachute demonstration team also jumped at the open house.

Obviously I was fascinated by the jumpers. The 82nd Airborne Division soldiers and the Golden Knights demonstrated the two common types of parachutes used by most people today. The troopers used the traditional "military-style," round canopy parachute. This is the style used in most "emergency" parachutes. The Golden Knights jumped with the ram-air (square) style of parachute favored by skydivers.

Where flight control, maneuverability, and style are important, such as in skydiving, the square, ram-air type of parachute is the chute of choice. Trained jumpers can fly and land a ram-air chute like pilots fly and land aircraft. Although some parachute companies offer square, ram-air canopies for use in emergency parachutes for expert jumpers, normally square chutes are not used in emergency parachutes.

For skydiving and certain other intentional jumps, FAR Part 105, Parachute Jumping, applies. The rule outlines the regulations for both pilots of aircraft used to make a jump, and those jumping out of the aircraft.

In this brief review of parachutes, we are not going to discuss the rules for making intentional jumps. After all, why would any self-respecting pilot want to jump out of a perfectly good aircraft? We are going to address some of the situations when someone must wear an emergency parachute in an aircraft and review some of the styles of parachutes available.

First the rule. FAR § 91.307, Parachutes and parachuting, details the types of emergency parachutes, required inspections, when parachutes are required to be worn, and when FAR Part 105 governs a parachute jump. For example, FAR § 91.307(a) states in part, "No pilot of a civil aircraft may allow a parachute that is available for emergency use to be carried in that aircraft unless it is an approved type...." Section 91.307(e) then explains what an approved type is. Approved means a parachute that was manufactured under either an FAA type certificate, an appropriate TSO 23 (series), or is a personnel-carrying military parachute identified by an NAF, AAF, or AN drawing number, an AAF order number, or any other military designation or specification number. Being an approved parachute is only part of the issue.

Like aircraft, a parachute must be periodically inspected to be airworthy. Section 91.307(a) requires (in part) that a certificated and appropriately rated parachute rigger must have packed the approved parachute within either 60 (for natural fabric which is rarely used today) or 120 days depending upon type of material used in the construction of the parachute or the type or style of parachute it is. A record of that packing is kept with the parachute for inspection by the person planning on using the parachute or by the FAA to ensure it is current and complies with the rule.

Finally, subparagraph (b) of the rule states, "Except in an emergency, no pilot in command may allow, and no person may make, a parachute jump from an aircraft within the United States except in accordance with part 105."

So much for the basic rules about parachutes, their construction, inspection requirements, and the rules for emergency parachutes and parachutes used for intentional jumps.

What does this all mean to the average pilot or flight instructor?

First, FAR § 91.307(c) states, in part, "Unless each occupant of the aircraft is wearing an approved parachute, no pilot of a civil aircraft carrying any person (other than a crewmember) may execute any intentional maneuver that exceeds a bank of 60 degrees relative to the horizon, or a nose-up or nose-down attitude of 30 degrees relative to the horizon."

FAR § 91.307(d) then says that subparagraph (c) does not apply to flight tests for pilot certification or rating or spins and other flight maneuvers required by the regulations for any certificate or rating when given by a certificated flight instructor or an airline transport pilot instructing in accordance with FAR § 61.167.

So again, what does this mean to the average pilot or appropriately certificated flight instructor? If you are a student under going training for a rating or certificate with a certificated flight instructor onboard, or if you are an instructor giving that instruction for any level of certification, such as a private pilot working on his or her commercial certificate, or a commercial pilot working on an instructor rating, neither of you must wear a parachute while doing any maneuver that may exceed the above limitations while under going training for a rating or certificate.

Another example is a flight instructor giving spin training. Certificated flight instructor applicants are required to have been given spin training and have an appropriate log book entry as required by FAR § 61.183(i)(1). The

section states the applicant must, "receive a logbook endorsement from an authorized instructor indicating that the applicant is competent and possesses instructional proficiency in stall awareness, spin entry, spins, and spin recovery procedures after providing the applicant with flight training in those training areas in an airplane or glider, as appropriate, that is certificated for spins, and ...."

The rule also requires a demonstration of that ability. Because spin training is a certification requirement, instructors giving spin instruction and their students are not required to wear parachutes. This exemption also applies to other students receiving instruction from an appropriately rated flight instructor because other pilot ratings require at least an awareness of spin training and avoidance.

However, an instructor demonstrating a spin for a non-student must wear and the person for whom the spin demonstration is given must wear a parachute as required by regulation.

So the regulations are clear, if you are doing any maneuver that exceeds the limitations listed above or is not necessary for normal flight and the flight is not a certification training flight then everyone on board must wear an approved parachute. However, anyone can wear an approved and a properly inspected parachute at any time. If worn or available in the aircraft the parachute must meet its own rules as outlined above.

Whenever a parachute is worn, the person wearing it must know how to safely exit the aircraft, since most aircraft flying today were not designed for quick emergency egress. For example, most aircraft do not have quick release doors to make it easier for a person to make an emergency exit.

So the key to wearing a parachute or not is knowing when a parachute is required by regulation and when it might be safer to wear a parachute. If the regulation requires it, you wear one. It's your choice if the flight situation might require one. Then the question becomes one of whether you're safer with or without a parachute.

It's your call.

A SHORT COURSE ON PARACHUTES

The following are a few of the terms you will hear when asking about parachutes. First is the style of container the parachute canopy is stored or packed in. There are three major types. There is the familiar *back pack* which like the name says stores the canopy against a person's back. There is the *seat pan* model where the canopy is stored in a container that serves as the aircraft's seat cushion and the person wearing it actually sits on the canopy. You may have seen this style worn in old war movies. And finally, there is the *chair style* model which is sort of a compromise between the two other styles. The chair style container stores the canopy in a long container that fits between a person's shoulders and knees. This style is popular in gliders and other aircraft where the pilot sits semi-reclined and the parachute provides a body-length cushion.

In addition to the three primary styles of parachutes listed, other common terms include:

- *Gores,* which consist of a number of sub-panels sewn together to form the canopy.
- *Suspension line strength,* which refers to the strength of the lines that connect the canopy to the harness.
- *Canopy material and porosity*. The canopy material—natural or synthetic—helps determine the inspection cycle for the parachute; porosity refers to the amount of airflow that can go through the canopy material. Normally, all other things being equal, a low porosity canopy will descend slower.
- *Opening time* refers to the amount of time needed for a parachute to open.
- *Descent rate,* which is normally listed in feet per second or meters per second, varies depending upon the weight of the wearer and size and porosity of the canopy.

There are two other important terms that everyone needs to know about new parachutes. One is the *maximum weight approved* for the parachute, which includes the weight of the wearer, clothes, and any equipment being carried by the person. Like the gross weight of an aircraft, it is important to stay below a canopy's certified maximum approved weight. The second is all new parachutes have a published *maximum deployment speed*. This refers to how fast the parachute can safely be deployed or opened. This is an important number because in an extreme case such as a person whose weight is at a parachute's maximum approved weight bails out of an aircraft in a high-speed dive well above the parachute's published deployment speed, the canopy could be seriously damaged to the point it might be ineffective in slowing the person's descent. So it is important that when anyone is buying a parachute to always buy one rated for a weight and deployment speed greater than that needed.

Finally, no discussion of parachutes would be complete without a comment on fasteners and hardware. Parachutes can be ordered with various types of fasteners and harness webbing. If buying a parachute, you should review the benefits of quick-disconnect versus standard fasteners. You should also always try on the types of parachute you are interested in and see which one fits better. You should also talk to your sales rep and ask for the benefits of the various options his or her parachute manufacturer offers. Like in everything else, you should comparison shop until you find the parachute that meets all of your needs.

EMERGENCY BAILOUT PROCEDURES FOR THE NON-JUMPING WORLD

by Allen Silver

NOTE: The following procedures are for emergencies only. Intentional parachute jumps must be conducted under applicable provisions of FAR Parts 91 and 105.

I. Attitude
- A. Attitude plays a major role in your survival.
  1. Keep a confident and positive attitude.
  2. Know that you can and will bail out if necessary.
- B. Believe that your parachute will save your life.
  1. Don't ever give up!
  2. Don't leave your chute on the ground because some official said you won't have time to use it.
  3. What may not work the first time may work the second time.

II. Plan Ahead (before you have an emergency).
- A. Keep you parachute in good condition.
  1. Have your equipment serviced regularly by a qualified rigger, who is familiar with your type of parachute. If necessary check their FAA license, for the proper ratings.
  2. Store your parachute properly, and know the rules for extended storage
- B. Pre-Flight your parachute—check for damage, dirt, etc.
- C. Practice your emergency procedures each time you fly—before and after each flight. Don't just get in and out of your aircraft. Practice.

III. Proper Fit of Your Parachute
- A. How to properly don your parachute
  1. Chest strap is always first
  2. Leg straps
  3. Other adjustments
- B. Make sure the speed and descent ratings of your parachute fit you and your aircraft.
  1. All parachutes are not created equal.
  2. Round vs. Ram-Air

IV. Major Reasons to Leave Your Aircraft
- A. Structural failure
- B. Severe control problems
- C. Fire
- D. Mid-Air collision

V. When You Make the Decision to Bail Out
Canopy/Door - Belts - and Buttocks in that order!
- A. First, jettison/open the canopy or door.
- B. Never unfasten your safety belts first.
- C. Claw, crawl, or do whatever it takes to get out.
  1. The exit will likely be very difficult.
  2. Get clear of your aircraft.
- D. Look, find, reach, and pull your ripcord.
  1. Look at the ripcord handle when pulling.
  2. Pull straight out with both hands.
- E. Parachute deployment time (must open in three seconds or less to be certified)
  1. Average time is two seconds. Once it's open that's as slow as you're ever going to go. If you're only six inches off the ground at the end of two seconds consider yourself very, very lucky.
  2. Your loss of altitude will vary according to the attitude of your aircraft. The time will remain constant not the altitude loss.

VI. Under an Open Canopy
- A. Take a deep breath and get back to work. (The fun's not over yet.)
  1. Know your canopy's steering system. (It should have one.)
  2. How do I make it turn?
- B. Avoiding life threatening obstacles is your number one priority.
- C. Face into the wind for landing. Only make minor turnsbelow 200' (unless to miss a life threatening obstacle).
- D. What's the forward speed of your canopy? (average five mph)
  1. As a rule of thumb as you are drifting forward or backward (look down), you can usually determine your approximate landing site.
  2. Unless you are coming straight down, expect to land somewhere between 45° and 60° in the direction you are drifting.

VII. Prepare for Landing. (You get only one shot at doing it correctly.)
- A. Keep your eyes on the horizon
- B. Feet and knees tight together
  1. Absorb most of the landing on the balls of your feet
  2. Don't raise your legs before landing and make sure they are directly under you
- C. When your feet touch, tuck in your chin and elbows

VIII. Problem Landing Areas
- A. Powerlines
- B. Trees
- C. Water

IX. Safely Back on Earth
   A. Use your parachute to help locate you.
   B. Keep a signaling mirror and/or whistle on you.
   C. Other high-tech survival items can you carry, i.e., cell phone
   D. Congratulate yourself on a job well done.
   E. Buy your rigger his/her favorite refreshment.

If you have any further questions, please feel free to write or call Silver. His office telephone is (510) 785-7070; FAX (510) 785-9213. His electronic mail address is silver@pia.com. His website is www.pia.com/silver.

Silver had several final comments for anyone who owns a parachute. One is to always send your parachute back opened and pulled out of the container for its required periodic repacking. This does two things. One it gives you practice in opening it. This is especially beneficial if you practice by having your parachute on in your aircraft and simulate an inflight bailout before and after each flight, followed by simulating pulling the ripcord. A good place to practice this is in a hangar with some type of protective cover on the floor to protect the parachute canopy or in your home. If done out of doors, just make sure the wind is not blowing. The second benefit is it makes sure the parachute rigger doing the inspection and repacking actually does the work. Some riggers have been caught by the FAA for fraudulently only resigning the parachute repacking card instead of actually inspecting and repacking the parachute. It is your parachute, money, and life at risk and necessarily in that order. You need to make sure the rigger does his or her job and does it professionally. An open parachute is one way to help ensure that the parachute was repacked. Parachutes are like aircraft, everyone who uses them places their lives and trust in the professionalism of those who inspect, work on, or sign off on the paperwork of each. That trust is absolute in the case of parachutes.

His other comment was if you wear a parachute while flying, practice your bailout procedures after each flight and only unbuckle it after you get out of your aircraft after the flight. The reason is if you get in the habit of unbuckling it in your aircraft before you exit, in an actual emergency you might inadvertently unbuckle it before you exit to jump. The problem is you might be hundreds of feet in the air at the time. In times of stress most of us revert to habit, and in this case the habit is to unbuckle the parachute before getting out of the aircraft—a habit that could hurt you. A good rule is to always remove your parachute outside of your aircraft. This allows you to experience some of the difficulties you might encounter coming out of the aircraft.

FOR MORE PARACHUTING INFORMATION

Parachute Industry Association

For more information about parachutes, readers can contact the Parachute Industry Association (PIA) at either its Internet website at <http://www.pia.com>, or its mail address at 1315 Cheyenne Drive, Richardson, TX 75080-3706. PIA's telephone number is (972) 231-4127. Its FAX number is (972) 783-8555.

United States Parachute Association

For more information about sport parachuting and skydiving, readers can contact the United States Parachute Association at its Internet website at <http://www.uspa.org>. Its mailing address is 1440 Duke Street, Alexandria, VA 22314. Its telephone number is (703) 836-3495. Its FAX number is (703) 836-2843.

EMERGENCY BAILOUT PROCEDURES

FAA Aviation News would like to thank Allen Silver for permission to publish his emergency bailout procedures and his comments about emergency parachutes. He is a FAA certificated Master Parachute Rigger, an FAA designated Parachute Rigger Examiner, a skydiver with more than 2,700 sport and professional jumps, and chairman of the Parachute Industry Associations (PIA) Rigging Committee. He is a retired Survival Equipment Technician from the California National Guard and the owner of the Silver Parachute Sales and Service company in the San Francisco Bay area. Many of the ideas and comments here were presented by him at the Soaring Society of America's annual Convention in Portland, OR, earlier this year.

SURVIVAL OF THE FITTEST

by Phyllis Anne Duncan and H. Dean Chamberlain

In this era of satellite search and rescue, to write about long-term survival in a remote area after a catastrophic event such as an aircraft accident may seem woefully passé. The fact is, there are thousands more 121.5 MHz ELT's out there than the new 406 MHz, and there are still remote areas in this country. Large portions of the western, mainland United States are not only remote but mountainous; the same is true of Alaska and Hawaii. Our neighbors to the north and south, Canada and Mexico respectively, also contain vast stretches of un-populated or under-populated territory. All of it can be inhospitable in a number of ways for the survivors of an aircraft accident or forced landing.

Note the optimism here. We are going to assume that you have followed your checklists, that you are well-trained and proficient, and that you have successfully landed your aircraft in a spot far from a population center. The ELT is working, and you and your passengers have survived and must continue to do so until rescue arrives. Part of your survival will be attitude—you must be willing to survive. As the pilot in command, even though your flight has come to a premature end, your passengers will look to you for guidance. Even if you are injured but coherent, they will still look to you to help them, and you need to be prepared for that responsibility as well.

There a number of survival guidebooks which range from a *Boy Scout Handbook* to in-depth guides used by the world's special forces and other military units. In the U.S. a popular one is the *U.S. Air Force Survival Guide*. The British *Special Air Services (SAS) Survival "Flickbook,"* which is based on the *SAS Survival Handbook,* is another resource. Again, there are many different sources for survival information, and no matter which you use, you will be prepared. Since winter is nearly upon us and snow has fallen in the more northern areas of the country, we'll limit our discussion here to cold weather survival.

Survival Starts at Home

No, we don't mean hoarding food for a natural disaster; we mean preparation. As you are planning your flight to cross remote or inhospitable areas, you need to plan your survival as well. In addition to aeronautical charts, you may want to invest in other maps that give you a more detailed picture of the terrain. From your aeronautical charts you determine the heights of obstacles and plan your cruise altitudes accordingly, but sectionals don't give as good a snapshot of the type of terrain as, say, a topographical map. A guidebook on the area can tell you the types of plants and trees you'll find and possibly any large animals to look out for. The locations of creeks and rivers is also important, and, again, sectionals show only the most prominent features. Even a road map may show roads not visible from the air or not shown on a chart.

Associate Editor Dean Chamberlain, our resident "survivalist" always says to dress for every flight as if you had to walk out of the woods. You may depart Maine for Florida in December and pack only light clothing for your destination, but what if you have to make an emergency landing in the Poconos or the Appalachians? The same is true for your reverse trip. A Mickey Mouse™ tee-shirt is little comfort or protection from the elements. The clothes you do wear or pack should not restrict your movements, and layering can protect you well from cold weather. Part of your survival gear should be some waterproof garments, and you should use any extra clothes, even lightweight clothing, for as much protection as possible. Proper footwear is particularly important; sandals or flip-flops are no good for keeping frostbite from your toes.

When you are dressing in layers, try to put windproof and waterproof clothing that "breathes" as the outermost layer. With layers your own body heat helps to keep you warm, so you need to keep that heat from escaping through any openings in the clothing. Consequently, you'll need something to tighten the clothing at the ankles, wrists, waist, and neck. Fleecy materials are especially good for this and, even when wet, stay warm. If all the layers make you sweat too much and lose essential fluids, loosen the collar or cuffs, or remove a layer.

Head covering is also important, since most of the body's heat escapes from the supply of blood vessels in the scalp. You may have to improvise here, if you haven't brought a hat or scarf along, but remember, this is survival, not a fashion show. Pack extra pairs of socks, a pair of which can also double as coverings for your hands, as I discovered one winter day at a football game.

If you are one of those super-prepared people, you might consider including a good sleeping bag in your aircraft. For better insulation, weight considerations, and better compressibility, down-filled bags are better than man-made fillers, but you have to keep down bags dry for them to be effective.

To fly over certain sparsely populated regions of Canada and Alaska in any weather, by law there are specific items that must be carried in a survival kit on board the aircraft. Additional items are required for winter-time flights. Some commercial vendors sell well-stocked kits in lightweight and highly portable carriers. Some people prefer to stock their own kits. For the specifics for Canada and Alaska, contact FAA's Regional Safety Program

Manager in Alaska at FAA, AAL-204, Anchorage Federal Office Building, 222 W. 7th Avenue, Anchorage, AK 99513-7587 or phone (907) 271-5912. For flights over the rest of the country—even certain sections of the east coast—the following items collected into a survival kit will add to your preparedness:

- Waterproof matches in a waterproof container
- Candles shaved square so that they pack easier
- Processed flint with a saw striker
- A magnifying glass for starting fires
- Needles and thread; the thread should be strong and can be wrapped around the needles for storage
- Fish hooks and fishing line
- A liquid-filled compass with luminous dial
- A light-emitting crystal or small flashlight for night-time map-reading or used as a fishing lure
- Two to three feet of snare wire or a commercial snare kit
- A flexible or wire saw, greased and with the handles removed for storage; slip the handles back on for use
- A tube tent or some type of plastic for use as a tent or ground cloth; a small, back-packing tent would be ideal; as a last resort, include some large, plastic leaf or trash bags
- 50 feet of lightweight line, such as parachute cord
- A medical kit, packed tightly in an airtight container; any dosage or warning information should be included, as should the expiration date; the medical kit should contain:
  - Any required medication for you or your passengers
  - Extra eyeglasses, if possible
  - An analgesic for pain relief
  - Diarrhea medication
  - A general antibiotic (Note: In the U.S. a prescription is required for antibiotics, and a doctor may not be willing to prescribe some for inclusion in a survival kit; in Europe, mild antibiotics are sold over the counter but may be illegal to possess without a prescription here in the U.S.)
  - An antihistamine if you have allergies and to treat insect bites or stings
  - Water-purifying tablets
  - Surgical blades
  - Butterfly sutures
  - Adhesive bandages in a variety of sizes and waterproof
  - Lastly, and, please, no one take offense, a non-lubricated condom without spermicide; they are strong and make good water-bags when inserted in a sock; they can hold up to two pints of much needed water

To make sure you're familiar with the use of certain items in your first aid kit, consider taking a first aid course. This knowledge is not only a good idea for survival, it can come in handy for everyday, minor emergencies that occur at home or work. Because it's important, we reiterate that if you or your passengers require regular medication, include a supply in the first aid kit, but note the expiration date and keep the medication fresh.

Other items you should include in an overall survival kit are a flashlight (keep the batteries fresh), a marker panel (a fluorescent strip one foot by six feet), and a so-called "space blanket," which enables the body to retain heat and is also reflective.

Some survival guidebooks suggest carrying powdered tea and packets of instant creamer. There is nothing more comforting than a warm cup of something in a survival situation. Whatever instant drink you include, make it decaffeinated. Caffeinated drinks are diuretics, meaning they make you lose fluids. We'll see why retaining fluids is important a bit later.

Solid fuel tablets save the trouble of trying to start a fire with flint or by rubbing two sticks together, but they need to be stored carefully and checked frequently. Signal flares are an explosive device that you might hesitate to carry on board unless, again, they are stored properly. (In fact, there was a recent disruption at a U.S. airport when a flare gun packed in someone's luggage went off while the bag was being handled.)

Attitude, Attitude, Attitude

People who give up, do not survive, whether it is life in general or the aftermath of an otherwise survivable aircraft accident. Being down in a remote area, with little to subsist on except your own wits, can be more stressful than the accident itself. Fear and anxiety are to be expected, but they cannot keep you from taking the actions necessary to keep yourself and your passengers alive until rescue comes.

Added to the anxiety is that the likelihood of a range of injuries is high. You or your passengers might be in pain even after treating such injuries as you can. The cold can become overwhelming. Sleep deprivation will occur and bring on fatigue. Hunger and thirst must be contended with, not to mention the loneliness of your isolation. Eventually, this will lead to boredom and then hopelessness. You pay less attention to the essentials required to keep you alive, and death follows soon after. After days or weeks? No, possibly only after hours, unless you have good coping mechanisms and a positive attitude—a will to survive.

Your will to survive is the biggest and most important part of a survival pyramid—the base. Above the base is knowledge you've attained during your preparation and possible training to survive. The tip of the pyramid—the smallest part—is the survival kit itself. The key ingredient in survival is you.

Water to Live

Most people think that food is essential to survival. The average person can go up to a month without food because the body stores fat to be used in just such an emergency. What the body can't do without is water, which stands to reason since we're 98% water anyway. The recommended amount of water per person is about a gallon a day.

The average person will survive generally no more than three days without

water. A survival kit packed with high energy granola bars does no good, literally, unless there's water to wash them down. But large quantities of water are difficult to carry in aircraft since water is so heavy. That's why the first order of business after assessing and treating any injuries is to find a source of water.

One of the best ways to have water is to retain what is in your body. You lose a certain amount when you breathe, but if you do not exert yourself and breathe regularly and calmly, you can conserve bodily fluids. You'll have to work a bit to set up your "survival camp" while you await rescue, but you need to pace yourself. If all survivors are able-bodied, then work can be delegated, but the rest breaks should be frequent. Smokers may desire a cigarette to "calm" themselves in a survival situation, but the deep inhalations and exhalations expend water as well, and smoking speeds up your breathing.

Even under a winter sun and with layers of clothing on, you will sweat, so you'll still need to stay under cover. Improvise shade with whatever materials you have at hand, including large pieces of fuselage. Even after an aircraft has burned, there are usually large enough pieces to improvise some sort of shelter.

Don't eat. That's right, don't eat, or keep your intake to a minimum. The process of digestion uses quite a bit of water in the body and can speed dehydration. Fat—the major component of food supplement bars and "power bars"—is hard to digest and makes the system work harder, using more water.

Alcohol is a no-no. It doesn't keep you warm; it doesn't calm you down; and it takes a lot of water from the body to break it down. (Besides, why would you have had alcohol on board the aircraft anyway?)

Nasal breathing is best, and the cilia of the nasal passages "filter" the water droplets out of exhaled air. Breathing through the mouth wastes water. Talking increases the rate of respiration, so keep that form of communication to a minimum. Total silence will only contribute to your sense of isolation, but keep conversations as short as possible.

If you manage to get a fire going, don't be tempted to sit so close that you sweat away your bodily fluids. When you do have a supply of water, sip it; the body will retain it better. When you come across water or have "made" a supply, the temptation to guzzle, especially after a long and thirsty interval, is great. Gulping water can actually make a dehydrated person vomit and lose even more fluid.

One cardinal rule of rescue is to remain with the aircraft, if at all possible. After all, it contains the ELT, and that's the signal the rescuers will be looking for. The lack of water, however, may require brief forays away from the crash site to obtain water, but you should always return to the crash site. If you're alone, leave an indication to rescuers which way you've headed, and remember, these excursions should not be so far from the aircraft that you can't find it again. If you go beyond sight of the aircraft, leave some type of trail to find your way back.

Depressions and crevices in rock can contain water, as do cupped leaves. You can also melt snow a little at a time in a container, gradually adding more to increase the volume. DO NOT EAT SNOW. You lose too much body heat melting it in your mouth, and it should be boiled first. You can also collect rainwater or dew if there is no snowcover. The bigger the material to catch the water the more water you'll have.

Pools of water that have no vegetation growing around them or which have bones of dead animals mearby are likely polluted, and your water purification tablets or even boiling won't make it potable. If you do find a pool and take water from it, boil the water first before consuming it or use the recommended number of water purification tablets.

Even in the winter time, foliage can be used to condense water. Include in your survival kit a clean, plastic trash bag which can be fastened over a leafy branch of a tree or over ground cover. When attaching the bag to a dangling branch, make sure the top of the bag where you fasten it tightly around the branch is above the bottom of the bag. Angle the bag so that condensing water drips into a corner of the bag. Take care when decanting it into another container so that you don't lose any of it.

When using ground foliage, you'll want to use the bag as a "tent" over the foliage, making sure the sides of the bag do not touch the foliage. Again, close the top of the bag. You may need a stick to hold the "tent" up, and you'll have to dig channels on either side of the foliage and line the channels with the plastic to collect the condensation.

You can even cut vegetation and still get some condensation. Lay the bag on the ground and line the side of the bag with stones. Place the cut foliage on top of the stones and make a tent with the other side of the bag, again closing off the top of the bag and using a stick to "tent" the plastic. If you place this arrangement on a slight slope, the condensation will run down into a corner of the bag.

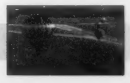
Of course, one of the easiest ways to have water is in containers you put in your aircraft. Just remember when transporting water, several small containers are better than one large one. A large container is more difficult to carry—particularly if you've been injured—and small containers are less likely to all break in an accident.

Helping the Rescuers See You

Three of anything is a universal signal for distress—three fires, three columns of smoke, three whistles, or three flashes of a light. In mountainous areas, the universal distress signal is six whistles or flashes a minute, a minute's pause, then repetition.

An extra hand-held ELT will extend the amount of time you're broadcasting, so don't use it until you've figured out the battery on the aircraft's ELT has given up. Follow the usual procedures for checking the operation of any ELT.

The downed aircraft can be canni-



balized for signaling—fuel for starting and maintaining a fire; the tires burn with lots of smoke; glass is a good reflective signaling device; and colorful interior seat upholstery can be laid out against a contrasting background to show airborne rescuers the way. Some manufacturers produce a colorful panel that can store in a pocket-sized container but which is visible against any background, but particularly snow. Designed for use at sea (because they float), these 40-foot long, fluorescent orange panels are visible up to 1.5 miles away at an altitude of 1,500 feet.

If you have enough combustible material, you might want to make signal fires, but they have to be out in the open. Beneath a canopy of trees, the smoke cannot escape, and the smoke is what the rescuers see. Make sure your "camp" is not downwind of the signal fires or that the smoke does not obscure any other markers you may have laid out. Since it's unlikely you'll have enough supplies to keep signal smoke going continuously, light the fires—three as the points of a triangle—only during the day or when you've spotted an aircraft in the distance.

See/Rescue® photo

Brightly colored panels, like this one, store in a small, pocket-sized container and can be carried in a survival kit.

Using the commercial marker panels or other materials from the aircraft, you can lay out universal ground to air codes explaining the immediacy of your needs. The markers should be in an open area out from under trees and spaced at least 10 feet apart if using more than one type of signal. See Figure 1, next page, for the codes for the markers.

You can also use marker panels to spell out message in Morse Code, or you can transmit Morse Code by flashing a light on and off. We don't expect you to run out and memorize Morse Code, but we've included it in Figure 2, next page.

There are a couple of pieces of modern technology that could preclude use of any of the traditional methods of signaling: A hand-held transceiver with a built-in GPS or a cell phone along with a hand-held GPS can make life simple. With a transceiver, remember to transmit on 121.5 MHz or on a local enroute or area common frequency shown on your sectional chart. With your cell phone, dial 911 or the cellular company operator.

When rescuers have spotted you, which they will acknowledge by rocking the aircraft wings, there are some body signals you can employ to communicate with them as well. You should exaggerate your movements to make sure they are understood by the rescue pilots. In your excitement, you may rush through a signal and confuse your rescuers. Some common signals are in Figure 3. The pilot of the rescue plane will respond to your signals in the following manner: If the message has been received and understood, in daylight the pilot will rock the wings; at night he or she will flash the aircraft's green position light. If the message has been received but not understood,

the pilot will fly in a right-hand circle during the day or flash the red position lights at night.

Unless someone needs immediate medical evacuation, it is not likely an airplane will land to evacuate you. Also, the terrain or its condition may not allow a landing or a subsequent takeoff. Rather, the pilot will relay your position to either a helicopter rescue crew or a land rescue team, who will soon show up to extract you.

Conclusion

Survival just doesn't happen; you have to make it happen. And you can do that by preparing yourself ahead of time with attitude, knowledge, and a survival kit. Many western states and some branches of the military offer survival training in actual conditions, and if winter-time flights over remote areas of the country are a frequent occurrence, you should consider enrolling in such a course.

Only the most fit survive in nature and in a crisis.

+

Body Signals Used for Emergency Communicatiion With Aircraft

Receiver Operates *Drop Message* *Can Proceed Shortly* *Pick Us Up*

All OK *Need Mechanical Help* *Land Here* *Do Not Land Here*

Affirmative (YES) *Negative (NO)* *Need Medical Assistance—Urgent*

Figure 1

MORSE CODE

You can signal Morse Code easiest by switching a light on and off: long flash of light for a dash (-), a short flash for a dot (•). A regular flash light may not be bright enough for daytime, so a bright light designed for signaling should be part of your kit. A signaling mirror can also be used but takes practice.

A	•-	U	••-
B	-•••	V	•••-
C	-•-•	W	•--
D	-••	X	-••-
E	•	Y	-•--
F	••-•	Z	--••
G	--•		
H	••••	1	•----
I	••	2	••---
J	•---	3	•••--
K	-•-	4	••••-
L	•-••	5	•••••
M	--	6	-••••
N	-•	7	--•••
O	---	8	---••
P	•--•	9	----•
Q	--•-	0	-----
R	•-•		
S	•••		
T	-		

Figure 2

SOS •••---•••

This can be laid out on the ground or snow using foliage, pieces of fuselage, or marker panels. Make sure the material you use contrasts with the background and is large enough to be seen by overflying aircraft.

GROUND-AIR VISUAL CODE FOR USE BY SURVIVORS

NO.	MESSAGE	CODE SYMBOL
1	Require Assistance	V
2	Require Medical Assistance	X
3	No or Negative	N
4	Yes or Affirmative	Y
5	Proceeding in This Direction	↑

IF IN DOUBT, USE INTERNATIONAL SYMBOL **SOS**

INSTRUCTIONS

1. Lay out symbols by using strips of fabric or parachutes, pieces of wood, or any available material.

2. Provide as much color contrast as possible between material used for symbols and background against which symbols are exposed.

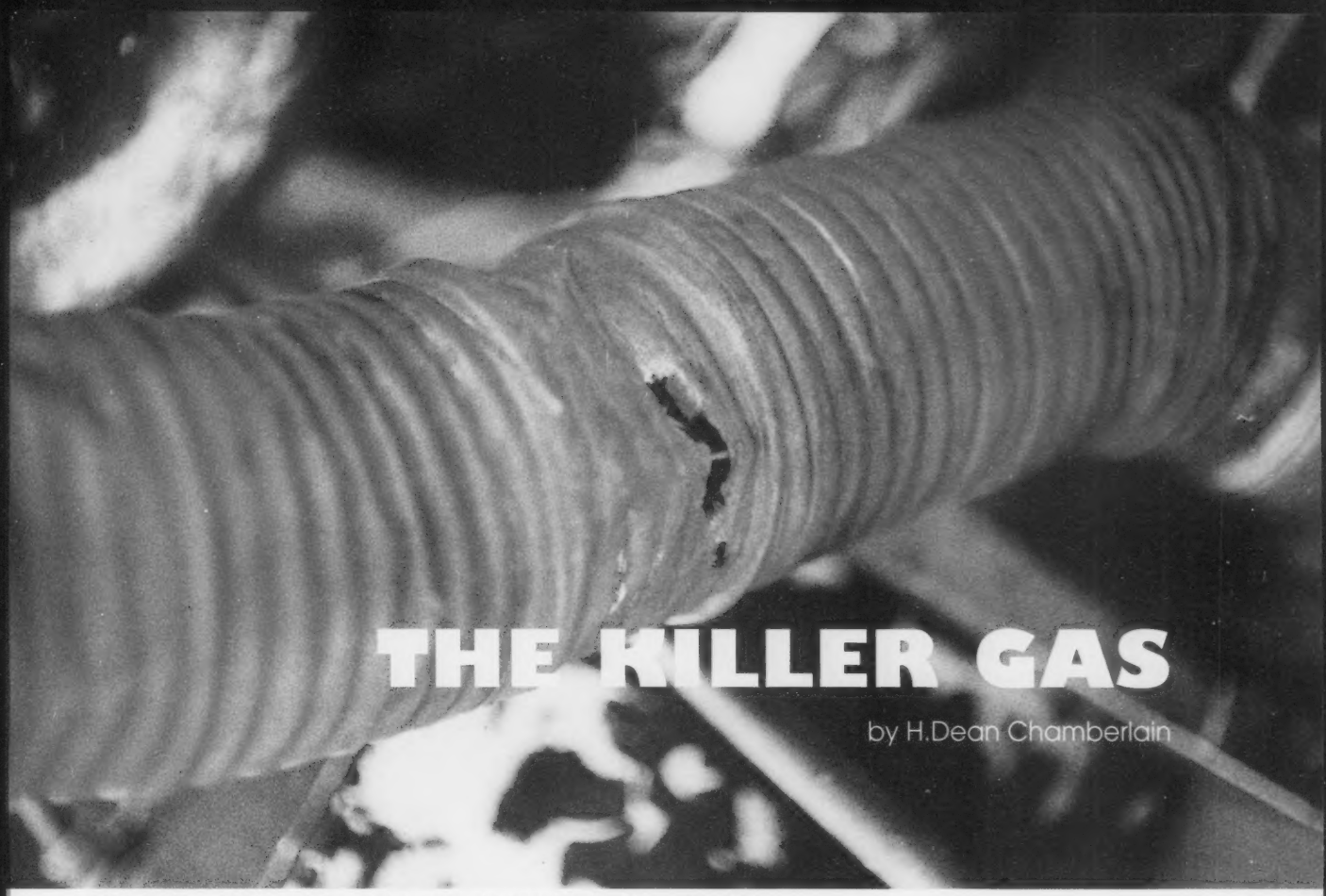
3. Symbols should be at least 10 feet high or larger. Care should be taken to lay out symbols exactly as shown.

4. In addition to using symbols, every effort is to be made to attract attention by means of radio, flares, smoke, or other available means.

5. On snow covered ground, signals can be made by dragging, shoveling, or tramping. Depressed areas forming symbols will appear black from the air.

6. Pilots of search aircraft will respond by rocking wings from side to side.

Figure 3



THE KILLER GAS

by H.Dean Chamberlain

A hole in the scat tube will allow carbon monoxide into the aircraft's vent system

As cold weather approaches, so does the threat of carbon monoxide (CO) poisoning in many general aviation aircraft. The deadly connection between cold weather and CO poisoning is simple. In many single-engine aircraft, the most common way to provide cabin heat is by heating outside ram air by routing it through a heat-exchanger shroud that fits over the aircraft's exhaust pipe. It is a simple and effective system that works very well. The problem is if there is any leakage of engine exhaust within the shroud area, some of the exhaust gas will be ducted into the cabin. That exhaust gas could contain deadly carbon monoxide.

Compounding the problem is the fact that as the outside air temperature starts dropping, pilots and their passengers tend to keep the window and other aircraft fresh air vents closed. The result can be a cabin full of exhaust gas containing deadly carbon monoxide, a gas that is colorless, odorless, and tasteless. Adding to the problem is the fact that the human body likes carbon monoxide. The gas is readily absorbed by the oxygen-carrying red blood cells in the body which then reduces the blood's ability to carry oxygen throughout the body to sustain life. Not only does the body readily absorb CO, the body is reluctant to release CO once it is absorbed by the blood. The result is, it takes a long while for anyone exposed to CO poisoning to recover completely once they are exposed to fresh air.

Because of the body's affinity for CO, CO poisoning can also occur slowly over an extended period of time. You don't have to have a sudden, large exposure of the gas to be at risk. Although such an exposure may kill you because of a lack of oxygen, your body can also become saturated to dangerous or deadly levels of CO over an extended period of time by absorbing small levels of the gas throughout the period. An example of this would be breathing a slight amount of CO throughout a long flight. As the amount of CO slowly builds up in the blood, the person may not realize he or she is at risk. This is why CO poisoning is called the silent death because not only can't you detect the presence of the gas with your normal senses, it does have this deadly, cumulative effect.

Then, like hypoxia, which is just another term for a lack of oxygen, the person suffering from CO poisoning starts losing the ability to determine why he or she is having a problem. Last year a general aviation aircraft crashed and killed its two occupants because the people on board could not respond to advice from air traffic controllers on how to save their lives. It

is believed the pilot and his 71 year-old mother were suffering from CO poisoning. According to newspaper accounts of the accident, the pilot passed out and his mother, also a pilot, tried to fly the aircraft. During the two-hour flight ordeal, the controllers tried to talk the woman to a landing in Connecticut, but she was becoming increasingly groggy and tired. Before the controllers realized she might be suffering from carbon monoxide poisoning, she, too, passed out. The plane continued to fly. Finally, while being chased by another aircraft and National Guard helicopters trying to help, the aircraft flew to New Hampshire and crashed. According to one of the newspaper articles, the four pilots in the civilian chase plane trying to help the woman could only watch "helplessly" as the aircraft "...plummeted to the ground...." According to the reports, by the time the air traffic controllers suggested the woman turn off the cabin heat and ventilate the cabin, it was too late. The woman had passed out before she could respond to the safety suggestions from the controllers.

So, what can you do to protect yourself if you fly an aircraft that uses an exhaust shroud as its heating source? You can do several things.

First, realize that CO-related accidents in aircraft are rare. Whether this is because pilots keep their aircraft's heating system in good mechanical condition, recognize the symptoms of CO poisoning and take appropriate action, or accidents caused by CO poisoning are blamed on other causes, we don't know. What we do know are some of the ways to reduce your exposure to CO poisoning this winter.

Check for holes in the firewall which could allow carbon monoxide to enter the cockpit.

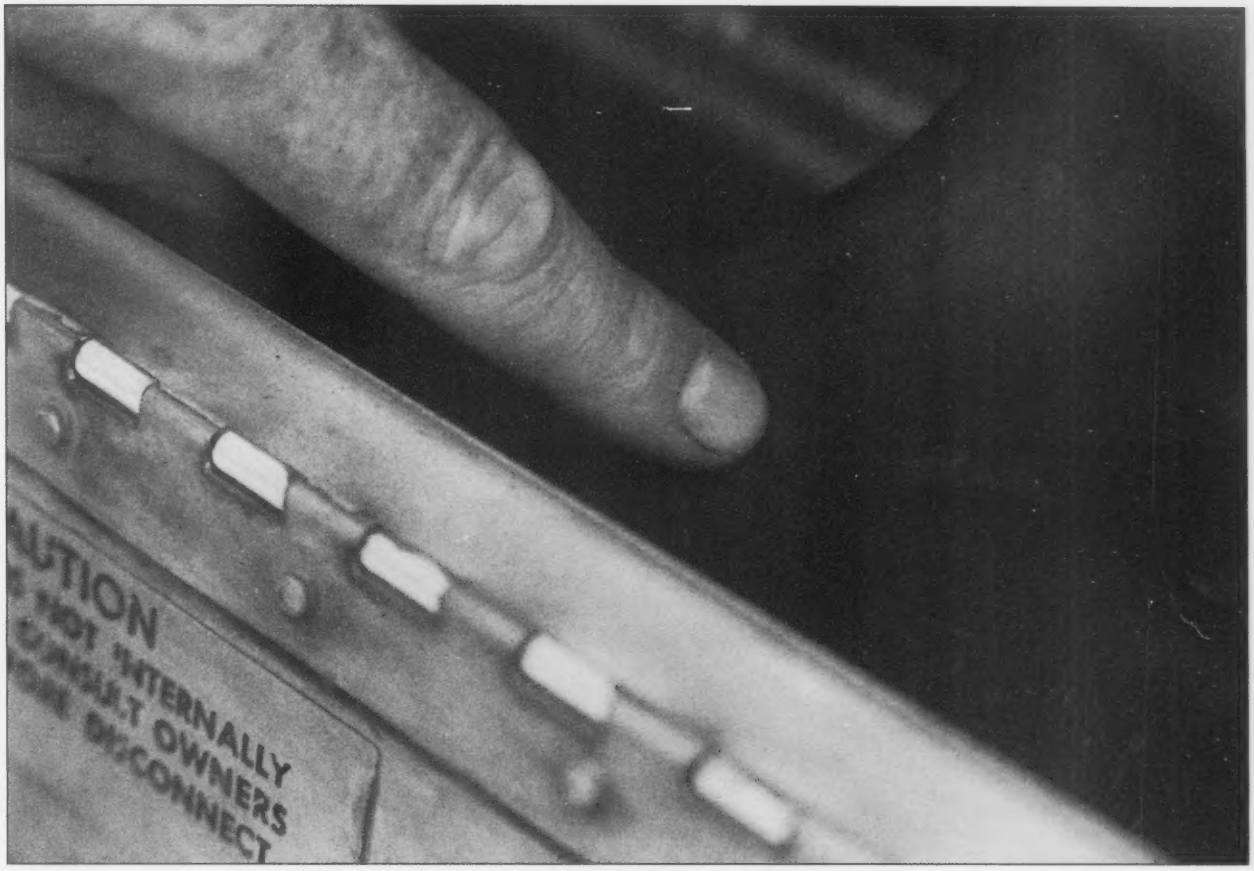
The first way is to have your aircraft's heating system thoroughly inspected by a knowledgeable maintenance technician, someone who knows and understands your particular aircraft. Although we are focusing on shrouded exhaust heating systems, some aircraft, particularly some light twin aircraft use an auxiliary gasoline heater in the nose to provide cabin heat. These types of heaters can also produce CO gas if not properly maintained and operated. Regardless of the type of heating system on board, have your maintenance technician inspect it for proper operation, air tightness, and exhaust leaks. The critical element is to make sure that no exhaust gas or contaminants can become mixed with the heated fresh air entering your cockpit area.

The second way is to be able to recognize the effects of carbon monoxide poisoning. Because the results of carbon monoxide poisoning result in hypoxia, the signs of hypoxia are common to both. Symptoms of headache, drowsiness, throbbing temples, nausea, fatigue, inattentiveness, tiredness, a blue coloration (cyanosis) are a few of the symptoms someone may experience with CO poisoning.

Once you know how to detect the effects of CO in the cockpit, the rest is easy. If you smell exhaust gas or suspect you might be exposed to carbon monoxide gas or feel any of the above symptoms, you need to turn off your heater and vent the cockpit. Although you may be somewhat incapacitated, you should decide if you need to land as soon as practical, or, if you are able, continue the flight to your destination. Since it is hard to tell how much CO you may have in your body or how much you might absorb if you continue your flight, it might be prudent to land as soon as practical, get some fresh air on the ground, and have your aircraft's heating system checked before continuing your flight.

Because of the dangers of CO, manufacturers have developed several different types of CO detectors for different applications. The most common seen in small aircraft are the small "dot" or "button" chemical-type of detector that changes color when exposed to CO. If you buy one of the small chemical type of CO detector, you need to make sure you follow the manufacturer's directions and change the detector as recommended.

Because any type of carbon-based fuel such as gasoline or jet fuel can produce CO when not properly burned in the combustion process, any time any type of carbon-based fuel engine is running there is the risk of CO being



The aircraft's exhaust system should be thoroughly inspected by a knowledgeable maintenance technician for any signs of exhaust gas leakage, such as cracks in the pipes or in welding.

formed. That risk exists not only in flight but on the ground as well. For example, a gasoline powered tug is running outside a small hangar or an aircraft engine is being tested in a hangar or a small gasoline engine preheater is being used to warm an aircraft's engine before the aircraft is moved from its hangar can all expose anyone within the enclosed areas to the danger of CO poisoning. Since the effects of CO are cumulative over time, even this type of exposure can put a pilot at risk. For example, let's add in a planned late night flight. We will say the pilot smokes. The pilot is planning on flying at 10,000 feet MSL. Throw in a little CO, and, when all of this is computed in the pilot's body, that pilot is at risk for the dangers of CO—and, to be really precise, to the danger of hypoxia.

The moral of this article is for everyone to recognize the dangers of CO and to take appropriate precautions. A careful review of your aircraft's operating handbook with particular emphasis on the safe operation and maintenance of its heating system is a step in the right direction. A careful review of the medical aspects of the dangers of CO is another step. Then because people involved in aviation just don't work on or fly aircraft, the final step is to remember that you can be exposed to carbon monoxide in your home, in your car, in your boat, in your hangar, or in your aircraft. If you are a camper or hunter for example, each year there are several reported deaths where campers or hunters are found dead in their tent, cabin, or RV from carbon monoxide after their heaters malfunctioned.

If you are involved in an off-airport survival situation such as a crash or precautionary landing or something as simple as being stranded in your car on the way home from the airport because of deep snow, and you are using a candle or some type of flame producing device for heat or light in your aircraft, car, or some type of confined space, you need to remember that not only might you be exposed to carbon monoxide, but that the burning candle or flame can also consume the available oxygen in the space. You must remember that too much carbon monoxide or too little oxygen can both kill. The secret is too avoid the first and have plenty of the latter.

Have a safe winter of flying.

PS: When traveling about, remember to carry a good emergency survival kit based upon your local conditions. Who knows? You just might never have to need it.

EXCERPTS FROM FAA AND NTSB ACCIDENT REPORTS

A computer search of NTSB and FAA accident data bases on the words "Carbon Monoxide" resulted in 44 reports since 1979. Several of the reports listed negative medical test results for carbon monoxide (CO) in some victims. Two reports were duplicated in both FAA and NTSB data bases. Four involved NTSB recommendations to FAA involving CO accident/incident data. The remaining reports highlighted accidents in which CO may have played a role. Although few in number, the reports show that anyone can be a CO victim. The following are edited excerpts:

- Aircraft bounced several times during landing. The pilot collapsed shortly after getting out of the airplane. Blood samples taken from the pilot three hours after landing contained 22.1% carbon monoxide. The left engine muffler overboard tube was broken loose from the muffler. The overboard tube had a .022 inch deep groove from rubbing against the engine cowling on the side where the crack originated. The muffler had been installed during the last 100 hour inspection, 68 hours previously. (ATP and Flight Instructor)
- The student solo pilot returned from a cross-country flight complaining of headache, nausea, and difficulty walking. The pilot stated that she had smelled exhaust fumes. She said she was not taught of a potential connection between exhaust smell and carbon monoxide poisoning and continued the flight. Medical tests revealed elevated carbon monoxide which required five and a half hours of 100% oxygen to reduce the CO to normal levels. Post-flight inspection revealed a crack in the repaired muffler which had been installed 18 hours earlier. (Student Pilot)
- "Fumes in cockpit made pilot nauseous. Landed in field. Occupants near incapacitation from carbon monoxide fumes." (Private Pilot)
- During a timing run at the Reno National Air Races, in a one of a kind twin-engine aircraft, the pilot reported he had a problem and was leaving the course. He was advised he was trailing smoke. During an emergency descent and a crash landing in open terrain the pilot was killed. Post crash fire destroyed the cockpit and other parts of the aircraft. "The pilot's helmet, oxygen mask, and other cockpit components revealed evidence of an in-flight fire [and] pilot's blood was 8% saturated with carbon monoxide." (Airline Transport Pilot)
- The pilot's airplane was number two in a four-plane ferry formation. The number three pilot said the number two pilot's flying was erratic during the flight. When within a mile of the landing airport, the number two pilot "pulled straight up, pulled left to the east at full power, then went into a slight descent." The other pilot chased the accident aircraft until he lost sight of the aircraft. According to the NTSB investigation, the accident pilot had reported smoke in the cockpit two days before the fatal accident. "The results of FAA toxicology specimens from the pilot revealed a carboxyhemoglobin saturation of 41.000 percent in the blood; loss of consciousness is attained at approximately 30.00 percent." (Airline Transport Pilot and Flight Instructor)
- "The pilot had climbed to 5,500 FT MSL [and] had trimmed the airplane at cruise power settings. He set the GPS navigational system for a direct flight then engaged the autopilot [and] set/switched the fuel selector to the left auxiliary fuel tank. He remembered passing [a fix] at which time, he set radios for arrival.... From that point, he could not remember anything else about the flight until he 'awoke' in a flat hay field...(in another state). The airplane had touched down in a wings level attitude and slid about 525 FT before hitting a fence [and] small trees. When the pilot 'initially awoke,' he was confused [and] thought he was still airborne." He eventually walked to a farm house. After a wait of an hour or an hour and a half the pilot was taken by ambulance to a hospital where tests were performed. A toxicology test later showed a 26.8% blood saturation level of carbon monoxide. (Private Pilot)
- "The pilot decided the weather was not good enough to fly, but he would run the engine and turn the tires. He was discovered in the plane by other pilots and later pronounced dead from carbon monoxide asphyxiation. The muffler had a 12-inch crack which a metallurgist stated could not have occurred in the 1.1 hours since the plane's annual inspection." (Private Pilot)

These narratives show that in some of the reports the victims and any passengers died. In other reports they survived as much from what we would call luck as from skill. As some of the above reports indicate, aircraft that have just been inspected can have faulty heating systems. Finally, as the student pilot reported, we in aviation need to teach all new student pilots the dangers of carbon monoxide and how to detect it. CO is also a good topic for inclusion an a flight review.

Don't allow the "silent killer" to claim you this winter.

RRENT vs. PROFICIENT

Legal - But Safe?

In recent years, aircraft accident data compiled by the NTSB indicate that the failure of the pilot in command to maintain control of the aircraft has been cited as a recurring probable cause of a number of aircraft accidents. With the inclusion of stall/spin related events, the number of accident investigations that are concluded with this brief and compelling statement increases dramatically. In fact, the most prevalent first occurrence identified in almost one-fourth of all aircraft accidents over the past 15 years is loss of control during ground or flight operations. Furthermore, the FAA has identified "Failure to Maintain Directional Control" and "Improper Operation of Flight Controls" as two of the most frequent cause factors of general aviation accidents. This trend is especially troubling considering the very essence of pilot responsibility is control of the aircraft in all flight regimes.

Accidents which result from loss of aircraft control typically involve multiple contributing factors, the most significant of which is pilot proficiency. Proficiency, by definition, *is the state of performing a given skill with expert correctness*. Unlike other activities, however, proficiency as a pilot encompasses a wide range of required knowledge and skills, including the ability to operate the aircraft in a precise and coordinated manner, an understanding of the regulatory requirements for operations in the national airspace system, and a knowledge of the aircraft and related systems. Furthermore, a pilot must be able to continuously evaluate the effects of a dynamic meteorological environment on the conduct of the flight. Pilot proficiency, therefore, relates to the pilot's ability to perform all tasks associated with the safe conduct of a flight with *expert correctness*.

In a 1901 speech to the Western Society of Engineers in Chicago, aviation pioneer Wilbur Wright stated, ". . . *that practice is the key to the secret of flying.*" Although this sentiment was expressed soon after the Wright Brother's first experimental expedition to the Outer Banks of North Carolina, the concept is as applicable for pilots today as it was almost a century ago. The importance of maintaining proficiency in critical aviation skills in today's complex operational environment increases proportionally with continuing advances in aircraft design and technology. The FAA, recognizing the importance of proficiency in these critical skills, created regulations to define the minimum level of activity required for a pilot to exercise the privileges of his or her pilot certificate.

The first of these regulatory requirements is addressed in FAR § 61.56, Flight Review. This regulation states that no person may act as pilot in command of an aircraft unless that person has accomplished a flight re-

view in an aircraft for which the pilot is rated within the preceding 24 calendar months. This review requires a minimum of one hour of ground training which must include a discussion of current FAR Part 91 General Operating and Flight Rules. The flight portion of the review must include one hour of flight training on those maneuvers and procedures that, *at the discretion* of the person giving the review, are necessary for the pilot to demonstrate the safe exercise of the privileges of his or her pilot certificate. Of course, the flight review must be conducted by an authorized flight instructor and a record of the satisfactory completion of the review must be entered into the pilot's logbook or permanent record.

The second regulatory requirement is addressed in FAR § 61.57, Recent Flight Experience. This regulation states that no person may act as pilot in command of an aircraft carrying passengers unless that person has made at least three takeoffs and three landings within the preceding 90 days. These takeoffs and landings must have been accomplished in an aircraft of the same category (airplane, glider, etc.), and the pilot must have acted as the sole manipulator of the flight controls.

The rationale for these regulations is based, in part, on certain aspects of the human learning process. Professor Edward L. Thorndike, an early pioneer in educational psychology, theorized that the ability of an individual to learn new skills, or to retain previously acquired skills, is influenced by certain conditions. These conditions, referred to as Thorndike's Laws, have served as the foundation of aviation instruction for many years. The first of Thorndike's Laws that pertain to a pilot's ability to accomplish specific tasks is the *Law of Exercise*, which states that tasks most often repeated are best remembered. Consequently, to maintain a minimum level of competency in a specific task, it is important to perform the task on a regular basis. In other words, the old adage "practice makes perfect" is good advice.

Professor Thorndike also suggested that tasks most recently performed are also best remembered. This means that not only is it important to repeat tasks on a periodic basis but within a recent time period as well. This principle is referred to as the *Law of Recency*. The influence of these conditions on the pilot's ability to perform certain tasks illustrates the importance of conducting critical flight operations on a periodic and recent basis. Although regulations pertaining to recency of experience and recurrent flight training attempt to ensure that pilots conduct these critical flight operations on a periodic basis, accidents occurring during critical phases of flight continue to plague the entire general aviation community.

To address this dilemma, it is important to first distinguish between being current and being proficient. Remember that proficiency, by definition, means performing a given skill with *expert correctness*. In contrast, currency simply refers to being up to date or occurring within a recent period of time. These definitions are useful in illustrating the point that being current in a particular task does not necessarily imply proficiency at that task. If we apply these definitions to the recency of experience requirements specified in the regulations, it becomes evident that a pilot, while legally current, may not be adequately proficient in certain critical flight skills to act as pilot in command.

In 1983, Embry-Riddle Aeronautical University conducted a study designed to measure the skill retention levels of newly certificated pilots and to determine how accurately these pilots were able to predict their own level of personal proficiency. The results of this research provide some interesting insight into potential cause factors of the most frequent types of aircraft accidents.

Primarily, the study revealed that general aviation pilots suffer a significant degree of cognitive and flight skill loss within a short period of time following the completion of structured flight training. Cognitive skill loss, in this case, refers to pilot judgement and decision-making ability. The areas of flight skill loss most affected include critical flight operations such as takeoffs and landings, stall recognition and recovery, minimum controllable airspeed, and emergency procedures. This finding is especially relevant for the general aviation community considering that more than 70% of all reported aircraft accidents occur during the takeoff and landing phases of flight. Furthermore, stall/spin events, loss of aircraft control, and takeoff emergencies represent a substantial percentage of the takeoff and landing accidents that occur each year.

Perhaps the most surprising aspect of the study, however, was the finding that *a pilot's ability to predict and evaluate his or her own skill retention levels for specific flight tasks is negligible*. Simply stated, pilots are seldom accurate in assessing their own level of proficiency in a given task. This is especially true for infrequently performed maneuvers such as emergency procedures. The inability to assess accurately personal proficiency combined with the potential for loss of critical flight skills helps to explain why in-flight emergencies continue to pose such a formidable challenge to aviation safety. In many cases, the FAA mandated flight review is the only exposure many pilots have to recurrent training in emergency procedures. However, the Embry-Riddle study suggests that the flight review required by the regulations may not be sufficiently frequent for relatively inexperienced pilots to maintain critical flight skills. The same may be true for more experienced pilots who do not exercise critical flight skills for prolonged periods of time.

It is equally important to consider that the requirement for the flight review may be satisfied in any category of aircraft for which the pilot is rated. For example, an individual possessing pilot in command privileges in both airplanes and gliders may accomplish the flight review in either an airplane or a glider. The privilege to carry passengers is then extended to both airplanes and gliders as long as the 90-day takeoff and landing requirement is satisfied for each category. Consequently, it becomes possible for a pilot, rated in multiple categories of aircraft, to be in compliance with the flight re-

view requirement, yet never participate in recurrent training in a specific category of aircraft.

The most important component of any accident prevention strategy is the pilot. Consequently, the need for every pilot to maintain a high degree of proficiency in critical flight skills is a crucial factor in the prevention of aviation accidents. One of the most effective ways to address the problem of proficiency in critical flight skills is participation in a personal recurrent training program. In fact, FAA Advisory Circular 61-98, *Currency and Additional Qualification Requirements for Certificated Pilots*, recommends that pilots should consider designing a currency program tailored to their individual operating environment and needs. The AC states: "The requirements specified in FAR § 61.57 should be regarded as minimums which need to be adjusted for various factors, such as overall pilot experience, different operating environments, complexity of the facilities used, and variations in makes and models of aircraft within specific categories and classes." In short, it is important for pilots to consider the need for currency beyond that specified by the regulations.

The creation of a personal proficiency program has many advantages. Primarily, the flexibility available to accomplish structured recurrent training that not only satisfies the requirements of the regulations, but also allows the integration of individual training needs as well. The development of a personal proficiency program will require an accurate initial assessment of individual flying skills and aeronautical knowledge by a competent flight instructor. This evaluation can then be compared to a known standard such as the FAA Practical Test Standards. The assessment period may also be used to provide the training necessary for the pilot to regain the level of proficiency required for initial certification. Assistance in developing a personal proficiency program can be obtained from a variety of sources including pilot examiners, individual flight instructors, FAA Safety Program Managers, or FAA appointed Aviation Safety Counselors.

One of the most important aspects of participation in a personal proficiency program is the establishment of a recurrent training schedule. As previously noted, current regulatory requirements may not provide an adequate level of recurrent training for every pilot. Participation in one of the many programs specifically designed to promote proficiency in critical flying skills can be used to supplement the training required by regulations. One such program, the FAA Pilot Proficiency Award Program, or WINGS, encourages participation in recurrent training on an annual basis. Not only does successful completion of each phase of the program satisfy the requirements for the flight review, but participants receive a distinctive set of wings and a certificate of accomplishment as well. Other opportunities for structured recurrent training include the instruction required to qualify for a higher level of a pilot certificate, or to add additional privileges to an existing certificate. Regardless of the type of program selected, the most important point to remember is that *training is the foundation of proficiency.* Unless each pilot continues to participate in a regular recurrent training program, critical flying skills erode very quickly.

In closing, remember that *current* and *proficient* are adjectives used to describe separate and distinct levels of competency. In the context of aviation, being current simply means that a pilot has complied with the regulations and is legal to exercise the privileges of his or her pilot certificate. Proficiency, on the other hand, describes a pilot who conducts each flight with the competence of a professional or with *expert correctness.* Proficiency also means making the commitment to put safety above all other considerations every time we fly. Proficiency goes well beyond the definition of being legal to fly. It's about being safe to fly.

Mr. Singleton, an airline pilot, is an active Aviation Safety Counselor in the Flight Standards District Office, Birmingham, AL. He is also a Trustee of the Soaring Society of America.

The Most Frequent Cause Factors of General Aviation Accidents

1. Inadequate Preflight Preparation and/or Planning
2. Failure to Obtain / Maintain Flying Speed
3. Failure to Maintain Directional Control
4. Improper Level-Off During Landing Flare
5. Failure to See and Avoid Objects or Obstructions
6. Mismanagement of Fuel
7. Improper Inflight Decisions or Planning
8. Misjudgment of Distance and/or Speed
9. Selection of Unsuitable Terrain for Landing
10. Improper Operation of Flight Controls

Source: Federal Aviation Administration

Haunting Tales From ...ASRS

October, as everyone knows, is the month of ghoulies and ghosties, and long-leggety beasties and things that go bump in the night. Because aviation folk are generally a rational and responsible lot, we figure they were immune to the sway of spirits and forces. But a recent excursion into the ASRS database proved otherwise. To our astonishment, there were numerous references to "witch hunts," "gremlins," and "hauntings." Here, then, is our harvest of tales from ASRS reporters' brushes with Fearful Things.

FRIGHT FLIGHT

It was Halloween weekend and the demons were out. What began as a VFR pleasure trip turned into near disaster. I missed the first clue that something was amiss on approaching the Class C airspace. I could not raise ATC and had to abruptly climb to 6,500 feet to avoid Class C airspace. Then, just as mysteriously, the radios came back on and functioned normally. The weather did not develop as advertised. Instead of clearing conditions as forecast, a solid overcast developed. I was told it would clear, but it did not. I anticipated filing IFR and continuing.

Unexpectedly, the #1 com radio began playing a local AM station. The #2 radio was intermittent and the LORAN died. A few miles southwest of destination I spotted a large broken area and descended, all the while trying to contact the airport. The cloud base was 1,200 feet with three to four miles visibility and I was able to stay clear of clouds. I approached the field and made a standard left hand pattern to the proper runway as indicated by the windsock. The Tower did not respond or signal with lights. I landed on Runway 10 without mishap. I was able to talk to the tower on Ground Control frequency. Tower explained the field was IFR at the time with inbound traffic and that I had violated the Federal Aviation Regulations.

Radio failure is always a fearful event. In this case I as lucky that a hole in the overcast appeared and I was able to land safely. I cleaned the radio contacts and plugs with contact cleaner and that cleared up the problems...In retrospect, I should have filed IFR and would have probably picked up the radio problems sooner.

An early precautionary landing at the first hint of radio trouble, rather than continuing into deteriorating weather, might also have prevented this "fright" flight.

WHEREWOLF

Taxi instructions were issued to us, "Taxi to Runway 3L and hold short of Wolf" which was acknowledged by the First Officer and missed by me. When I asked the First Officer if we were cleared to the runway or did they (Ground) want us to hold somewhere, he replied, "Oh no, we're cleared all the way." Well, passing Wolf, I was informed of my mistake...The lesson here is to be certain of your instructions prior to acknowledgment. Also, if one of the crew members is uncertain, clarify it with the proper ATC agency...The fact that "Wolf" doesn't appear on the airport diagram didn't help, either.

FLYING PUMPKINS

During the past 20 years or more the antique aircraft club would fly to the aerodrome, do a fly-by, and then on the second pass drop pumpkins and flour bombs on the runway. We would than proceed to land and watch the rest of the show. On this particular day one of the pumpkins hit a vintage biplane. Unfortunately, there was damage and loss of revenue. Needless to say, I'm sorry that it happened and will do whatever is required to make sure it never happens again.

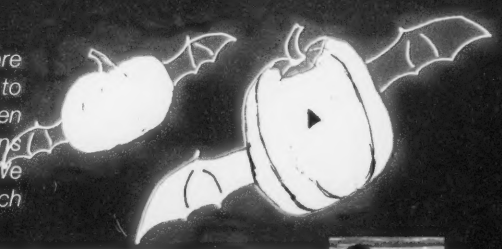
The obvious comment would be to cite FAR § 91.15, "Dropping Objects." Otherwise, more practice is recommended—or a change of hobbies.

GREMLINS OF THE AIR

On the downwind leg, not quite yet parallel with runway, I thought about extending the landing gear. However, I decided it was a bit early...Since we had never been into this airport with this aircraft...we became preoccupied with target air speeds, height above ground and glide path that the final landing check was forgotten. Some power was required to maintain the desired glide path, therefore the gear warning horn did not sound until what was happening, but it was too late."

Why does a pilot forget something as important as the landing gear? I think on every pilot's shoulder sits a gremlin called complacency. The checklist is to complacency what the cross and wood stake are to Dracula—it should keep the victim from getting bitten.

This article originally appeared in *CALLBACK*, the monthly safety bulletin from the FAA-supported NASA Aviation Safety Reporting System (ASRS).



TRYING TO TEACH PILOTS ABOUT "AIRWORTHINESS"

by Tony Janco and Bob Martens

We've tried everything. Sometimes we start with FAR § 91.7(a) which states: "No person may operate a civil aircraft unless it is in an airworthy condition." What is unclear or confusing about this?

Sometimes we start by reading from a standard insurance policy which will state: "There is no coverage if the aircraft is operated in-flight with your knowledge and consent knowing its airworthiness certificate is not in full force." That, too, is in language that is fairly clear.

Sometimes we start with a story about the innumerable pilots who have purchased the "bargain" airplane only to find out on their first annual inspection that they've bought a piece of junk. This is distressing to most pilots and generally results in a call to the FAA for action against some maintenance shop. In many cases, the owner will have to pay a large sum of money to make his or her aircraft "airworthy."

No matter what approach we take, whether it be one of legality, liability, or money, the subject of "airworthiness" seems to confuse and perplex most aviators. From feedback we receive, it seems that A) either the subject is far too complex to be of value to pilots or B) the airworthiness of airplanes is the mechanic's responsibility. Far too often, pilots get really upset when we try to explain their responsibility with regard to airworthiness issues. WHY? Who has more to lose than the poor pilot if an aircraft is poorly maintained??????

Having clearly established the importance of airworthiness, we will then ask someone to define it for us. Blank stares appear. We ask where they might find it defined. We see more blank stares.

Yes, it does seem strange that the only place the definition appears is on the Standard Airworthiness Certificate. Airworthy means that the aircraft conforms to its type certificate and is in condition for safe operation. So, what the heck is a type certificate? This is getting confusing. Most pilots are amazed to know that each certificated aircraft has a "birth certificate" that spells out in explicit detail what was on the aircraft when it left the factory.

Is the pilot really responsible for knowing these intimate details?

We then explain that at least once a year, a mechanic who holds an Inspection Authorization (IA) ensures that the aircraft conforms to type design on the annual inspection. Just how many pilots know the difference between an annual and a 100-hour inspection?

This leads us to the maintenance areas of FAR Part 91. Pilots get real glassy eyed when we talk about the regulatory compliance with Part 39. Part what? Yup, that's the part that talks about Airworthiness Directives

UNITED STATES OF AMERICA
DEPARTMENT OF TRANSPORTATION—FEDERAL AVIATION ADMINISTRATION

STANDARD AIRWORTHINESS CERTIFICATE

1 NATIONALITY AND REGISTRATION MARKS	2 MANUFACTURER AND MODEL	3 AIRCRAFT SERIAL NUMBER	4 CATEGORY
N33596	PIPER J3C-65	14073	NORMAL

5 AUTHORITY AND BASIS FOR ISSUANCE

This airworthiness certificate is issued pursuant to the Federal Aviation Act of 1958 and certifies that, as of the date of issuance, the aircraft to which issued has been inspected and found to conform to the type certificate therefor, to be in condition for safe operation, and has been shown to meet the requirements of the applicable comprehensive and detailed airworthiness code as provided by Annex 8 to the Convention on International Civil Aviation, except as noted herein.

Exceptions

NONE

6 TERMS AND CONDITIONS

Unless sooner surrendered, suspended, revoked, or a termination date is otherwise established by the Administrator, this airworthiness certificate is effective as long as the maintenance, preventative maintenance, and alterations are performed in accordance with Parts 21, 43, and 91 of the Federal Aviation Regulations, as appropriate, and the aircraft is registered in the United States

DATE OF ISSUANCE	FAA REPRESENTATIVE	DESIGNATION NUMBER
2/10/80	Rusty Rivets	AEA-FSDO-62

Any alteration, reproduction, or misuse of this certificate may be punishable by a fine not exceeding $1,000, or imprisonment not exceeding 3 years, or both. THIS CERTIFICATE MUST BE DISPLAYED IN THE AIRCRAFT IN ACCORDANCE WITH APPLICABLE FEDERAL AVIATION REGULATIONS

FAA Form 8100-2 (8-82) GPO 892-804

SAMPLE

(AD). And we all know how important they are, right? Unfortunately, many pilots view AD's as "nit noid" items rather than proven accident cause factors in aircraft accident reports.

Documentation of maintenance done on aircraft IS important, especially if the lack thereof requires a previously accomplished item to be done again because the records don't contain an accurate account of what was accomplished. Remember, when the IA returns the aircraft to service, he or she has to be absolutely sure all required inspections and/or maintenance was accomplished. They put their livelihood on the line each time they do this.

Everyone loses when maintenance actions are not properly recorded. Maybe that's why FAR § 91.405(b) requires each owner or operator to "ensure that maintenance personnel make appropriate entries in the aircraft maintenance records indicating the aircraft has been approved for return to service."

It should be painfully clear at this point that pilots and those who perform maintenance on aircraft MUST be involved in continual dialogue. This may come as a shock to many of you, but we have a long way to go to achieve this worthy goal.

One last thought. The practical test standards which mandate the minimum level of qualification the FAA will accept when certifying pilots provides excellent guidance as to what is expected. Private pilots must "exhibit knowledge of the elements related to certificates and documents by locating and explaining the airworthiness certificate, airworthiness directives and compliance records, maintenance requirements, tests, and appropriate records."

Just for grins, try asking any certificated pilot to perform the above task. The results may amaze you.

Lest we be accused of being "heavy handed nay-sayers," we will clearly admit that maintenance related causal factors in aircraft accidents are way down. That is wonderful news. But, with the legal, financial, and liability issues we raised at the outset, can we really afford to ignore this VERY important issue of "pilots responsibility for airworthiness issues?"

We think not!!

+

Mr. Janco and Mr. Martens are the Airworthiness and Operations Safety Program Managers, respectively, at the Windsor Locks, CT, FAA Flight Standards District Office.

For more information on this subject, see Advisory Circular 20-5G, "Plane Sense." It may be obtained free of charge from the U.S. DOT, Subsequent Distribution Office, Ardmore East Business Center, 3341 Q 75th Avenue, Landover, MD 20785.

YOU'RE INVITED TO BECOME A DRIVING INSTRUMENT OF CHANGE!

Customer Satisfaction Survey

Coming Soon in
Your Mail from FAA's
Flight Standards Service

Tell us:

- How Flight Standards can serve you better.
- What Flight Standards is doing right.
- What product or service you would like improved.

FREQUENTLY ASKED QUESTIONS ABOUT CUSTOMER SATISFACTION SURVEY # 2

1. What is this survey all about?

This is a Flight Standards Customer Satisfaction Survey which is being sent to approximately 250,000 randomly selected pilots, aviation maintenance technicians (AMT), and domestic air operators and air agencies. Questions focus on satisfaction with the quality of service Flight Standards field offices are providing.

2. Wasn't there another Flight Standards Customer Survey a while back?

Yes, there was. It was in the form of a postcard and was the first of its kind in Flight Standards. The majority of aviation professionals were surveyed before 1996; employees of carriers were surveyed more recently.

3. What is the schedule for conducting Survey #2?

Current plans are to conduct all of Flight Standards Customer Survey #2 by December 1998. A small beta test was run in July with pilots and AMT's from FAA's Central Region. The actual survey phase for pilots and AMT's will be in the early fall, and the actual survey phase for air operators and air agencies should be in late fall 1998.

4. How will the results of the survey be used and who will receive them?

The results will be used to address specific concerns, to spot "best practices," to target resources based on trend results, and to perform tactical and strategic planning. A general analysis of the questionnaire results will be available eventually, either in a technical publication or on an FAA web site.

A contractor will be editing out any names mentioned in the comments and will be producing an electronic list of the comments for Flight Standards. These comments—with no identifiers—will be made available to the local district office and can be made available to anyone who files a Freedom of Information Act (FOIA) request. No one in Flight Standards will see the original questionnaire forms or the original comments.

5. Can I personally be affected?

Unwarranted "pointing of fingers" will be guarded against in the following two ways:

As mentioned, all names contained in the comments, whether that of an individual or air organization, will be removed before the comments are typed and the electronic version is given to Flight Standards.

Each question will have a validity check. That is, any question without sufficient respondents will be discarded so that erroneous conclusions can be minimized. This will ensure that those questions with sufficient respondents will have valid results.

6. How long will it be before the results are published?

This is highly dependent upon the following number of factors: 1) the schedule for conducting the survey, 2) the time it takes to get approvals for official publication of the results, and 3) the time it takes for the actual publication. If the survey is implemented on schedule, preliminary results should be available in February 1999, with a technical publication or report on the Flight Standards web site in spring 1999. Published reports will include only the rolled-up national results.

7. Whom may I contact to ask questions or give feedback about Survey #2?

If you have any questions, please feel free to phone our toll-free number, 1-888-526-3780, and leave a message. Your call will be returned, and an answer to your question will be provided.

PROPPIN' REVISITED

Wintertime places stress on aircraft batteries and increases the temptation to hand prop. FAA Aviation News *has always been of the opinion that hand propping should be a last resort, but, if it becomes a necessity, the proper sequence of procedures must be followed to ensure safety. The following item is reprinted with permission from the Experimental Aircraft Association's (EAA)* Vintage Airplane, *June 1998 issue, and authored by Mr. Roger Gomoll, an EAA advisor. -Editor*

> **Hand Propping** (def): To start or attempt to start an aircraft by placing the hands on the propeller and spinning the propeller manually. Known by most pilots as a rarely practiced or even lost art.

Accident reports still indicate that hand propping is a significant threat to life and limb and loss of aircraft.... Since some Antique and Classic aircraft were built without starters, hand propping is an important [safety] issue.... Here are some tips for a safe and successful start.

1. *Secure the Aircraft*. Although you may consider hand-propping a routine way to start your aircraft, each time that you do it you are faced with monumental risk. The force that is sent to the propeller by even the least powerful aircraft engine is enough to cause major physical damage. Treat each start as a life-threatening event for you and your passengers. To be fully safe, your aircraft should be tied down and chocked. A quick tiedown at the tail of your aircraft is cheap insurance and may save your life or keep you from losing body parts.

> **Hemingway Starter:** (aeronautical slang) Hand propping an aircraft. Derives from the title of an Ernest Hemingway novel, "A Farewell to Arms."

2. *Do a Complete Pre-Flight and Cockpit Check.* Aircraft propping accidents sometimes come about when the aircraft engine controls are left in the incorrect position when the propeller is being turned. Before touching a propeller, be completely sure that the mag switches are off, and that the throttle is closed. If the mags are hot, there may be enough fuel left in the engine to start the aircraft when you turn over the engine by hand.

> **Armstrong Starter**: (aeronautical slang) Hand propping an aircraft. Derives from the strength needed in the arms to spin the propeller with enough force to start the engine.

3. *Have a Competent Pilot at the Controls.* It is important that there be a hand on the controls—and it must be a person who is properly trained in the operation of your aircraft. Propping an aircraft is best practiced by two people, who can both be responsible for the safe starting of the aircraft. The person at the controls must know the operation of the ignition switch and the throttle, and be fully versed in operating the brakes. Your life may be resting in this person's ability to control the aircraft. The person at the controls and the person at the propeller should both know the appropriate calls and responses for the starting procedure.

> **Pratt and Whitney Haircut:** (aeronautical slang) Having one's head come perilously close to a spinning propeller, usually after having incorrectly hand propped an engine. Also known as a "Continental Haircut."

4. *Use Proper Starting Procedures.* Although there are a couple of methods of safely propping an engine, common to all is an unwavering respect for the power of the engine. Another completely inarguable rule is to always consider the engine "hot." Magnetos operate when they are not grounded—and if the "P" lead or grounding wire comes loose or is broken, the ignition system will operate even if the switch is in the "OFF" position. Another rule that must not be ignored is to prop the aircraft in such a way that your body's motion naturally moves you away from the engine as you move the prop. You must at all times maintain your balance.

> **Knuckle Rapping** (aeronautical slang): Having one's fingers hit by a quickly moving propeller, caused by not propping an aircraft correctly.

5. *Never Attempt to Hand Prop an Aircraft Without Proper Training.* To learn this skill, find someone who knows how to safely hand-prop an aircraft. This is an art which should be learned from a person who knows how to hand start an aircraft. By learning to correctly hand-start your aircraft, you'll greatly enhance the probability you will end your flying career at a very old age.

• An Open Letter to Fred Laird

I just read your article about Papua New Guinea (PNG) in the March 1998 issue of *FAA Aviation News* and wanted to send my compliments on a fine job on the article and for being "brave" enough to ride along in that *Twin Otter*!

Back in 1977, I spent five months in PNG trying to get a job as a pilot with the then-largest commuter or the national airline, Air New Guinea. Though I was unsuccessful, due largely to the antiquated pilot certification regulations and "expat" hiring requirements that were in place, I did have the opportunity, through coordination with some stateside friends of mine and contacts they had in PNG, to "ride along" with several small commuters on several types of aircraft into many airports similar to those you described. I even got the chance to try landing at one; I don't know if the CAA rules allowed it or not, but the pilot let me "have a go." Because I had significant recent experience flying in the bush in Alaska and Guatemala, both mountainous regions, similar to PNG, I believed I was up to it.

I was quite shocked and humbled to find, however, that what those commuter pilots defined as "airports" were even less than what I was familiar with in Alaska, where we used to land on sand bars, rivers, and in open fields! It turned out I wasn't "up" to it and wisely relinquished controls to the experienced pilot well before he would have taken them from me for the successful landing.

By the way, navigation then did NOT include GPS. The pilots all had to develop a thorough knowledge of the topography; pilotage was the navigation technique of choice. I was absolutely amazed at their ability to recognize things and precisely know where they were. As you know from YOUR visit, many of those valleys, mountains, rivers, and villages look alike. Getting lost seemed a sure bet to me!

My time there did one thing for me: it firmly implanted a love for the country, the people (and the 700-odd languages!), and the climate that has stayed with me for more than 25 years. I continue to harbor a desire to return one day, perhaps not as a pilot (the older I get, the harder it is for me to imagine doing that kind of flying for a living!), but perhaps one day as the FAA Representative, such as you are now.

James Wilkinson
FAA Academy, AMA-230

• And Another

I am an air traffic controller at the Dallas-Fort Worth (DFW) Airport. I just finished reading the March 1998 edition of the *FAA Aviation News*. Having read the magazine in the past, I was surprised to see your article on the bush flying in Papua New Guinea. It is indeed a departure from some of the work that I have seen in previous editions. It is a refreshing look at a different aspect of aviation for most pilots in North America. I happen to have been to Papua New Guinea a few times myself, five times since 1989, and I have ridden as an observer in the right seat of several aircraft operated by a missionary group. The numerous grass strips, located in some very awkward locations, are definitely exciting! My hat is off to the folks who daily risk their lives for the sake of those living in such remote areas.

Edwin L. Detherage
ATCS DFW TRACON

Thank you for your letter. It is good to know that we can still surprise our readership. Aviation is such a diverse—you pick the word: industry, community, profession, lifestyle, passion, hobby, interest, or, in this case, humanitarian operation. There are stories that need to be told, but seldom are, which highlight the benefits aviation can bring to the lives of others. Not all of aviation deals with simply getting from Point A to Point B in the shortest amount of time or at the lowest cost.

• No Man's Landing

I just finished reading my copy of the May/June 1998 *FAA Aviation News*.

Boy, was I glad to see that I wasn't the only one interested in analyzing that "no-man's land" between landing back on the runway and returning safely to land. I actually took that to heart for my home field a couple of years ago. Please humor me, and have a look on the Internet at http://members.aol.com/jepardo/mayday.html. I not only considered getting back to the runway, I also looked at the closest off-airport sites (rapidly disappearing) in case you couldn't make it back.

And I quantified the data with topo maps and spreadsheets of aircraft climb profiles! Have a look!

I fly out of Gaithersburg, MD (GAI), a rather busy field in the Washington DC area. What I did was to try and quantify that "uh oh" zone for various airplanes in the Congressional Flying Club (a fairly interesting and influential bunch of characters, if I must say so...) as well as other airplanes (you'll see). If you have a problem linking to the table of contents, (~/index.html), just insert "no1.html" in its place. This site will be easy to see if you have a T1 line or fast connection. Some of the graphics take a while to load. Aside from index.html, no1(.html), no5, no6, no7, no11, no12, no13, no14 through no19, no20 (especially!), no21, & no22 are most important for you to see what I've done.

I hope you have a look.

Jeff Pardo
Rockville, MD

We took a look and thought others may want to take a look. Although FAA did not verify the accuracy of Jeff's work, we think it is a good example of what can be done around an airport to help pilots make that "uh oh" decision. Good job, Jeff.

1998 INDUCTEES TO THE FLIGHT INSTRUCTOR HALL OF FAME

Three flight instructors, who have a combined total of nearly 40,000 hours of flight time have been selected as the 1998 inductees to the Flight Instructor Hall of Fame. The three—Bill Kershner, Marvin Easter, and the late Joe Vorbeck—will officially be inducted during a program this fall in Oshkosh, WI. The Hall of Fame is administered by the National Association of Flight Instructors (NAFI).

"The three 1998 inductees reflect the experience and dedication within the flight instructor community," said NAFI Executive Director Sean Elliott. "This significant Hall of Fame effort parallels the programs of NAFI, which has worked to recognize and raise the status of flight instructors for more than 30 years."

Kershner, of Sewanee, TN, has logged more than 11,000 hours of flight time, including more than 4,000 as a flight instructor. He is perhaps best known as the author of several books and manuals for pilots and instructors. One of Kershner's nominators called him "right at the top of everything that a flight instructor should be." He was also the FAA/Industry 1992 Flight Instructor of the Year.

Easter, a Columbus, Ohio resident, has more than 40 years experience in aviation, including more than 11,000 hours of instruction. He was also chief flight instructor for the Ohio State University aviation program, which trains some 200 flight students per year. He has also participated in numerous teaching and course development activities for flight safety.

Vorbeck, who died in November 1996, was often called "Mr. Instrument Flying" because of knowledge of instrument flying rules and procedures. He logged more than 14,000 flight hours. He taught aviation at the University of Illinois and was chairman of general aviation technology at Purdue University. He also assisted with formation of NAFI in the mid-1960's.

The Flight Instructor Hall of Fame was founded in 1997. The Hall of Fame was created to raise the stature and recognition of flight instructors, as well as promote greater appreciation of the role flight instructors have in training pilots at all levels. A six-member committee considered nominations submitted from around the world. Each year's class of inductees are then announced at EAA AirVenture Oshkosh. Public recognition of all inductees is maintained at the Experimental Aircraft Association's Air Adventure Museum in Oshkosh, WI.

DISRUPTED FLIGHT—TWO YEARS IN PRISON

A Santa Barbara, CA woman was sentenced early in July to two years in prison after she was convicted for interfering with flight crewmembers last year on a Continental Airlines flight. The woman attempted to kick through the cockpit door, and her companion (to be sentenced later) poured hot coffee on a flight attendant.

Finally, it seems, that as far as interfering with flight crewmembers is concerned, if you do the crime, you get the time. FAA has a "zero tolerance" policy toward disruptive passengers but must rely on the judicial system since passengers have no certificates for FAA to take action against. Hopefully, prison sentences and a resultant criminal record will be a deterrent to others who may be tempted to interfere with crewmembers.

THE 1998 AMT AND CFI OF THE YEAR AWARD WINNERS

Gary Schandl of Belleville IL, is the 1998 Aviation Maintenance Technician of the Year. Schandl's 25 years in general aviation aircraft maintenance has covered a vast range of area from parts fabrication to major structural repair to various types of aircraft. Nineteen of these 25 years have been with the Midcoast Aviation, Inc. where he is presently Manager of Quality Assurance for all three Midcoast locations.

Mr. Schandl currently holds an Airframe and Powerplant (A&P) and Inspection Authorization (IA) and is a Designated Airworthiness Representative. Believing that quality work begins with a sound training foundation, he has implemented training programs for maintenance personnel at Midcoast and has also continued his own education in his personal life.

For the past two years he has been an Aviation Safety Counselor for the St. Louis (MO) Flight Standards District Office's (FSDO) Aviation Maintenance Safety Program. This working relationship with FAA has allowed him to gain information on current regulatory changes and share it with the aviation community. He also never turns down an opportunity to spread the history of aviation and to inspire younger people

FAA AVIATION NEWS welcomes comments. We may edit letters for style and/or length. If we have more than one letter on the same topic, we will select one representative letter to publish. Because of our publishing schedules, responses may not appear for several issues. We do not print anonymous letters, but we do withhold names or send personal replies upon request. Readers are reminded that questions dealing with immediate FAA operational issues should be referred to their local Flight Standards District Office or Air Traffic facility. Send letters to FORUM Editor, FAA AVIATION NEWS, AFS-805, 800 Independence Ave., SW, Washington, DC 20591, or FAX them to (202) 267-9463;. e-mail address: Dean.Chamberlain@faa.dot.gov

to pursue a career in aviation.

According to his nominator, "despite changes within aviation and the workloads he continually encounters, he maintains the highest quality of maintenance without sacrificing quality."

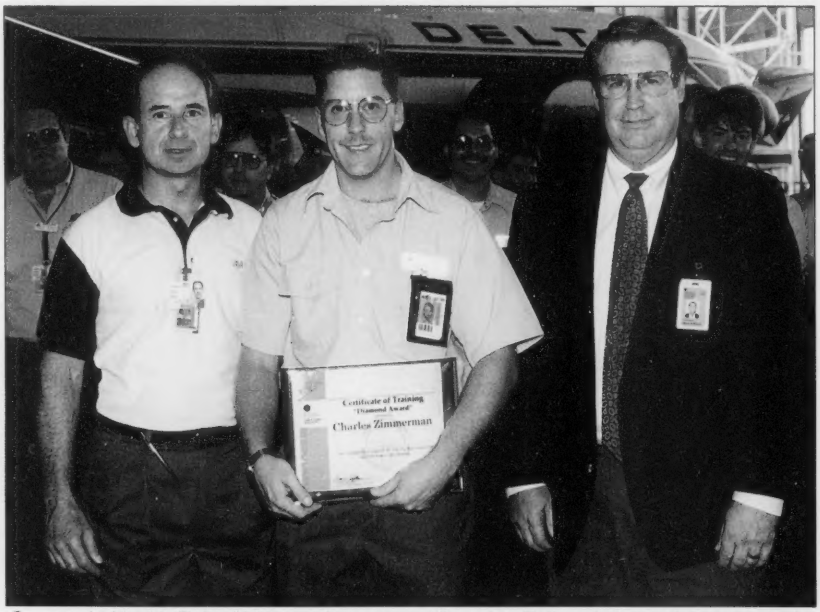
John "JC" Boylls of Encinitas, CA, is the 1998 Certificated Flight Instructor of the Year. Mr. Boylls has been active as a flight instructor in the San Diego area for over 20 years with more than 3,000 hours of dual instruction given. He was appointed as an Aviation Safety Counselor and designated as an FAA Pilot Examiner for the San Diego FSDO in 1989 based on his outstanding professional reputation and quality of flight instruction. He has served these roles with distinction, evidenced by being selected as the 1997 San Diego FSDO Counselor of the Year and by his status as senior mentor of the district pilot examiner group. Besides running his own flight school, Mr. Boylls is currently working with King Schools to develop a multi-media flight training material. He is also a member of the U.S. Coast Guard Auxiliary Aviation program and is one of the few auxiliary members who provides aviation safety training to active duty Coast Guard aircrew.

According to one of his nominators, Mr. Boylls "has a strong and active leadership role in the aviation community tirelessly promoting general aviation and challenging flight instructors to achieve high standards of instruction and professionalism." And another said he "doesn't accept good enough where safety is concerned." But Mr. Boylls sums it best by saying, "Professional flight instructors must never become complacent or satisfied with their own qualifications and ability. They should be constantly active and alert for ways to improve their qualifications, effectiveness, and the services they provide their students. Flight instructors are considered authorities on aeronautical matters and are the experts to whom many pilots refer questions concerning regulations, requirements, and new operating techniques. They have the opportunity and responsibility to introduce new procedures and techniques through their students and through certificated pilots with whom they come in contact."

Both Schandl and Boylls will be presented the CFI and AMT of the Year Awards on October 19 during the National Business Aircraft Association's 51st Annual Meeting and Convention in Las Vegas, NV. Over 30 general aviation companies participate in the Industry Awards Program providing special recognitions to the winners for their achievements in the general aviation industry.

This program is sponsored by the Aircraft Electronics Association, AOPA Air Safety Foundation, Experimental Aircraft Association, Federal Aviation Administration, General Aviation Manufacturers Association, Helicopter Association International, International Society of Aviation Maintenance Professionals, National Air Transportation Association, National Association of Flight Instructors, National Association of State Aviation Officials, National Business Aircraft Association, and Professional Aviation Maintenance Association.

Beginning in 1999 there will be three awards categories: Aviation Maintenance Technician, Certificated Flight Instructor, and a new one—Avionics Technician. Contact your local FSDO or FBO for an application or more information on the 1999 Awards Program. The applications need to be submitted to your local FSDO by December 31, 1998, and the 1999 winners will be honored at the AOPA Expo in Atlantic City, NJ.



Surrounded by his Delta Airlines maintenance colleagues, Delta aviation maintenance technician Charles Zimmerman (center) receives the Diamond Award of the FAA's AMT Award Program, designed to encourage aviation technicians to pursue recurrent training. Jim Maucere, Director of Base Maintenance for Delta (left) and FAA Principal Maintenance Inspector for Delta Barry Basse (right) show the FAA/Industry partnership in Delta's commitment to continued improvement in maintenance education. The corporate management of Delta is fully backing participation in the AMT Program by all maintenance employees throughout the Delta system. Photo by Delta Airlines

Editor's Runway

from the pen of Phyllis-Anne Duncan

A BRIGHT FUTURE

This past summer I saw the future of aviation, and it was a promising picture. No, I didn't have in my possession a crystal ball, nor do I have any particular prescient abilities other than a couple of healed broken toes that tell me when it's going to rain. Rather, I saw the future of aviation in a college intern who worked in FAA's General Aviation and Commercial Division. I say that future looks promising because I saw in this young woman the enthusiasm that many of us have lost or misplaced in our daily pursuit of bureaucracy. Those of us who heard the call of public service and opted to leave our flying jobs for "the other side" become focused on different things and occasionally forget why we learned to fly in the first place—its sheer joy and ultimate challenge.

Casilda "Casey" Beltré is a 22-year old college senior who loves airplanes, loves everything about them, anything to do with them. At Dowling College on Long Island, Casey is majoring in aviation management, and she has previously interned at FAA's Boston Flight Standards District Office. During her few short weeks with us in FAA Headquarters, no assignment was too dull or boring for her. She even brought her work ethic into meetings the rest of us jaded types roll our eyes in dismay at. And she contributed. She brought a fresh approach. She was fearless and focused. She made us remember who we are and what we're supposed to be doing. Several old dogs learned a lot of new tricks from a college student.

Casey reminded me of someone I once knew who was so airplane crazy that she lied to her parents when she was 16 and said she was at play practice when she was really at the local airport, washing and fueling airplanes, sweeping hangar floors, keeping the books, operating the radio in exchange for time with an instructor. In short, no job was beneath her as long as she was around airplanes. Alas, this fairy tale had a delayed happy ending. The 16-year old was found out, grounded by her parents, and didn't get back into flying until she was out and making her own money.

Casey rises above so much, and not just above the accompanying jokes about interns that seem to be so popular lately. She absolutely dashes the notion of a self-centered, uninvolved Generation X-er. One of four daughters of a divorced mother originally from the Dominican Republic, Casey could have fallen into the stereotype for a girl from a stressed urban area—gangs, violence, dropping-out. But her mother and sisters wouldn't let her; Casey wouldn't let herself. Casey once told me that her mother was her biggest hero, followed by her three older sisters. They all encouraged each other, challenged each other, and they've all achieved their goals. The three older daughters are all professionals now, and they have induced their mother to retire. Actually, she's also a student, studying to be a translator for the law firm where one of her daughters works.

I present all this so you can understand and appreciate Casey because someday you'll be sitting behind her—she'll be in the cockpit and you'll be in the cabin. Like the 16-year old mentioned above, Casey had no aviation strain running through her family. Merely, she discovered aviation and picked it for a career, one that she loves now and will continue to love. I said she was fearless. Fearless in the sense that she wants to face and absorb everything aviation has to offer her, and that is so much. When the U.S. Army Golden Knights Parachute Team came to FAA Headquarters to discuss some air show issues, Casey was in the meeting. These experienced soldiers, trained to harness their emotions, were won over by her interest and ebullience, so much so, they invited her to Fort Bragg for a tandem jump. Unhesitatingly, she agreed. Unfortunately, on the appointed day, the weather wouldn't cooperate, and she didn't get to make her jump. Casey, however, took it as an early lesson in pilot judgement. "This is good," she said. "When I'm a pilot, I'll be faced with decisions like this. I got to hear people far more experienced than I decide not to take a risk. This will stay with me."

In one of those ironies of life, each of us who worked with Casey learned something from an arrangement where we were supposed to be the teachers and she the student. We re-learned just what aviation can mean to us; we recalled the bright spark that flying can bring into our lives; and we remembered what lured us into public service in the first place. In spite of constantly asking ourselves, "Were we ever that young and eager?" we remembered that we were, and we re-dedicated ourselves to a profession and a cause—aviation safety—that has perhaps slipped a bit in our priorities.

Casey went back to school with an FAA ball cap and an FAA windbreaker, which, in spite of our warnings, she affirmed she would wear and wear proudly, making some of us a bit ashamed for the brief denial of our dedication.

And when Casey left, FAA Headquarters fell back into its bureaucracy, so briefly and so happily interrupted, and Dowling College became a brighter place.

And the 16-year old, 30 years later as she sat writing this, decided I have seen the future of aviation, and it is promising, just as promising as the gleam in the eyes of every young person on his or her first airplane ride. I'm happy to hand the controls over to Casey and all those like her, content that they will take the industry we all love and improve it then hand it over to the next generation of aviators.

'Til next time...

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